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(54) Title: A METHOD OF CONDITIONING IRON ALLOY-BASED ANODES FOR ALUMINUM ELECTROWINNING CELLS

(57) Abstract: A metallic aluminium electrowinning anode structure has initially an iron-based alloy outer part with an active anode surface which is essentially metallic and free of any ceramic compounds of metals from the metallic. The anode structure undergoes a conditioning treatment that includes: substantially preventing the essentially metallic active surface free of said ceramic compound from reacting with any reactable species, in particular oxygen and fluorine species, until immersion into a molten electrolyte containing oxygen ions; immersing into the molten electrolyte the metallic anode structure with its essentially metallic active surface free of said ceramic compounds; and polarising the immersed metallic anode structure to form on the metallic anode structure a dense and coherent integral iron-based oxide layer which is electrochemically active for the oxidation of oxygen and which inhibits diffusion of oxygen towards the metallic anode structure. The metallic anode structure can be covered with a temporary protection medium, e.g. a protective layer, that prevents ceramic-forming reactions at the metallic anode surface and is separable before or upon immersion into the electrolyte.